REMARKS

Claims 2 - 16, 25, 26, 30 and 31 remain active in this application. Claims 17 - 19, 23 and 28 have previously been canceled and claims 1, 20 - 24, 27 - 29 and 32 - 37 have been canceled by the above amendment. New claims 38 - 44, including features from claims canceled above, have been presented to clarify, reduce and resolve issues remaining in this application. Substantially verbatim support for claim 38 (and product-by-process claim 44, based on claims 38 and 39) is found on page 11 of the original specification while support for new dependent claims can be found throughout the specification and in canceled claims for which support has previously been demonstrated or is evident. No new matter has been introduced into the application.

It is respectfully pointed out that the present application has an effective filing date of February 16, 1996 and thus has been pending *in excess of nine years*. Accordingly, close supervisory review is respectfully requested under the provisions of MPEP §707.02(a).

Claims 1 - 7, 10, 12 - 14, 16, 20 - 22, 24, 27 and 29 - 37 have been rejected under 35 U.S.C. §103 as being unpatentable over Baker et al. in view of Boucher et al. and Maybon. Claims 8, 9, 11, 15, 25 and 26 have been rejected under 35 U.S.C. §103 as being unpatentable over the same combination of reference in view of the further teachings of Cox et al. These grounds of rejection are respectfully traversed, at least in regard to claims other than claims 13 - 16, particularly as being moot in view of the amendments made above and respectfully traversed based on certain procedural issues in regard to claims 13 - 16 which will be discussed below.

Initially, it is noted that claims 13 - 16 were originally presented for purposes of provoking an interference with U. S. Patent 5,855,149 to Islam et al. These claims were timely presented under 35 U.S.C. §135(b)(1), the patent and claims therein duly identified, a showing of support in the present application duly made and a proposed count duly presented. These claims were initially withdrawn from consideration pending allowance of original claims 1 - 12 but later rejected based on the Baker et al., Maybon and Cox et al. references which remain applied to the claims and the Examiner's rejection of these was affirmed on Appeal. However, it is respectfully submitted that the initial withdrawal of these claims from consideration was improper under MPEP §2307.02 and the later rejection of these claims also appears to be procedurally improper since the prior art applied is also competent in regard to the Islam et al. patent which has an effective filing date *subsequent* to that of the present application (which claims priority of parent application 08/602,379, filed February 16, 1996) and the rejection is thus applicable to patented claims of Islam et al. while there is no indication apparent from the action in which the rejection was first made that the approval of the rejection by the Director of the Technical center was obtained, as required by the MPEP. While Applicant does not wish to further contest the propriety of the rejection of claims 13 - 16 under 35 U.S.C. §103 (e.g. based on prior art) at this time in view of the decision on Appeal, these claims are retained in this application pending determination of what remedy, if any, may be or remain available in regard to these apparent procedural errors on the part of the USPTO. By the same token, the above traverse of the rejection of claims 13 - 16 on grounds of improper procedure applied by the USPTO is respectfully submitted to be a *bona fide* response under 37 C.F.R.

§1.111 entitling Applicant to reconsideration notwithstanding the retention of these claims or the alteration of the ground of rejection to further include reliance on the Boucher et al. reference.

In regard to the remainder of the claims, it is respectfully pointed out that all independent claims in the application (other than retained claims 13 and 16) have been canceled and replaced by a single independent method claim 38 (upon which new independent product-by-process claim 44 is principally based). This claim (and claim 44) has been drafted to recite the explicit steps by which cladding (as distinct from welding in general) is achieved while avoiding the use of the term "cladding" which was evidently the source of some confusion on Appeal in regard to the intended meaning of the term. Specifically, the Board of Patent Appeals and Interferences stated that "[a]lthough *Baker does not use the terminology*, it is clear that the "*weld* bead" (12) therein is "clad" on the outer surface of the cylindrical die blank (10)" (page 5, emphasis added) and thus the Board of Patent Appeals and Interferences did not recognize the term "cladding" (in either a noun or verb usage) as a term of art which is differentiated from welding, in general.

That "cladding" is (or, in the context of the invention, has become) a term of art implying a particular type of "welding" can be determined from any of a number of recognized reference sources or authorities such as "Modern Welding Technology" by Howard B. Cary, second edition, page 773, defines a weld as a "localized *coalescence* of metals or non-metals with or without the application of pressure, or by the application of pressure alone, and with or without the use of filler metal" (emphasis added) whereas Charles E. Albright, Welding Engineering Department, The Ohio State University, has defined (April 29, 2005) "cladding" as a "welding process in

which the *surface* of a material is modified by welding a different material to the surface. A *minimum of intermixing is implied.*" (emphasis added). That is, welding, in general, implies a mixing of materials throughout the weldment while such mixing is limited in a cladding process even though the limitation may not be quantifiable. Therefore, claim 38 has been drafted to avoid the term "cladding" to avoid any need for any inferences to be made from the use of the term "cladding" and to thus render that issue moot.

It is important to note that in general welding, such as arc welding, filler material such as the blade material of Baker et al. is applied to the weld principally in a molten form while the same applied heat used to melt the filler material may also serve to melt the material of the surface to which the weldment is applied, both directly and by heat transfer from the filler material. In contrast, it should be appreciated that claim 38 (and 44) recites a step of heating the die body to form a puddle of melted die body material and a *further* step of *applying blade material in the form of a powder to the puddle*. These recitations, in combination, support the melting of the powdered blade material *using the residual heat from the puddle* as well as heat from the laser and the melting of the powder thus tends to cool the puddle and thus limits intermixing of the die body and blade materials. (Of course, other heat transfer processes occur, as well, such as heat conduction in the die body to melt the puddle somewhat outside the area of impingement of the laser beam and the change in concentration/distribution of heat from the laser beam as it impinges on a portion of the accumulating deposit above the die body surface and becomes increasingly defocused with deposit height; both of which have significant, although generally lesser, and generally beneficial effects on the result in accordance with the invention.)

It is believed that this basic heat transfer mechanism supported by the recitations of claim 38 (and 44), while possibly complicated by other associated heat transfer processes, supports the meritorious effect of forming a uniform bead of relatively uniform composition and internal alloying concentration profile (e.g. with alloying of blade material and die body material due to mixing and diffusion diminishing with extension distance from the die body) even where the shape of the bead is closed or intersects another portion of the bead. Thus, this heat transfer mechanism allows the formation, in accordance with the invention, of closed and intersecting blade shapes without an apparent starting or ending point that is characteristic of welds in general (see attached comparative photographs A - F in which the start/end points of other deposition techniques is readily apparent in photographs C and E, as noted thereon) and, perhaps more importantly, without annealing (see page 5, line 4+, of the original specification) or alteration of alloy composition at blade shape closure or intersection points due to significant remelting of the bead or underlying die body (which is possibly avoided by the defocusing of the beam as it impinges upon a raised, previously deposited portion of the blade material deposit together with powder behavior at raised areas). Moreover, due to this basic heat transfer mechanism supported by explicit claim recitations, a bead having a particularly advantageous cross-sectional profile can be developed having a height of several millimeters or more in a single pass using relatively low heat input from the laser and which can be performed equally well on either a planar or cylindrical die body surface. None of these meritorious effects achieved by the invention and supported by explicit recitations of new claim 38 (or 44) or any expectation of success in achieving such

meritorious effects are taught or remotely suggested by the prior art relied upon, taken singly or in any combination. Further, it is respectfully submitted that the terminology of the applied references in regard to "welding", "brazing" and the like should be carefully evaluated in regard to the fair inferences to be derived from such terms in regard to the steps explicitly recited in claims 38 and 44 and the metallurgical processes supported thereby.

Specifically, Baker et al. is directed to a welding process by which deposition of hard metal blades is deposited on a softer metal substrate. The heat source is evidently an electrical or plasma arc (Baker et al. antedates the development of even laser *welding* which is emphasized by the statement in Baker et al. at column 3, line 31, that the "weld bead can be applied manually" whereas laser welding cannot be performed manually due to criticality of beam focus and numerous safety issues). This process is not dimensionally or geometrically precise and results in a cutting die which is not durable for complex blade pattern layout. Further, the high heat input involved in arc welding causes cracks and porosities and other metallurgical defects and dimensional distortions.

More importantly, however, the cross-sectional weld bead shape, before or after machining, as illustrated in Figures 3 - 8 of Baker et al. do not show any penetration of the weld 12 into the substrate 10; typical of a so-called "cold weld" in which metallurgical bonding of the blade is relatively small or at least substantially compromised compared with the case where significant melting (as claimed) of the die body material is performed. It appears that this lack of penetration of the weld into the die body in Baker et al. is not merely an incident of the disclosure in a patent application and/or drawing simplification for clarity in view of the repeated references in Baker et

al. to application of a weld *bead to* the die blank as well as the illustrated weld bead 12 profile at the interface with die blank 10; the sharp, nearly perpendicular cross-sectional profile being largely characteristic of minimal, if any, substrate melting using an arc as a heat source. Moreover, it appears that the avoidance of substrate melting in Baker et al. may be the expedient by which Baker et al. avoids alloying of the die body material with the blade material.

Therefore, Baker et al. is seen to be substantially irrelevant to the explicit heating (e.g. with a laser to form a puddle) and blade material applying (to form a deposit) steps explicitly recited in claims 38 and 44. Further, to the extent that laterally projecting shoulders 21 are critical or important to Baker et al. as it appears that they are "to reinforce and securely anchor the bead in position" (column 4, lines 6 - 7; also tending to indicate that metallurgical bonding of weld bead 12 to die body 10 is relatively small or at least compromised), Baker et al. tends to teach away from significant die body melting, as claimed. Further, in regard to the dependent claims, Baker et al. has virtually nothing to do with development of a half elliptical bead shape, particularly of near net shape, or the successful formation of closed or intersecting patterns without compromise of metallurgical properties at such pattern closures or intersections.

The Maybon reference refers to brazing which is well-understood in the art to be distinct from welding and is thus largely non-analogous to Baker et al. and not properly combinable therewith under the precedent of In re Gordon, 221 USPQ 1125 (Fed. Circ., 1984) since any modification of Baker et al. in accordance with the teachings or suggestions of Maybon would preclude the functioning of the method of Baker et al. in the

intended manner and vice-versa (although the process of Maybon may, in fact, be better described as a particular form of welding). While the method of Maybon may appear to superficially resemble that now claimed in claims 38 and 44 in some respects, it is respectfully submitted that the type of cutting blade to which Maybon is directed and its required properties are so different from the present invention that they do not provide any evidence that one of ordinary skill would be led to the claimed method or product-by-process or be provided with an expectation of developing the meritorious effects of the present invention or even that the teachings or suggestions of Maybon are even applicable to a cutting die of the type to which the method of Baker et al. is directed.

Specifically, Maybon is directed to a comminuting blade which works against a material in shear using an action which is principally abrasive. The comminuting blade is in the form of a disk with ridges 5 rather than a planar or cylindrical die body surface and has grooves between raised blade portions or ridges 5 for discharge of comminuted (e.g. reduced to a powder) material similar to the pattern of antique stone mill wheels used for grinding grain or the like.

Maybon is directed to resurfacing of the entirety of the surfaces of raised ridges 5 with a material which will exhibit a substantial roughness in microstructure (achieved by adding hard material particles which are not fully alloyed or otherwise homogeneously incorporated within the resurfacing material deposited) even when machined or worn. It is important in this regard to preserve the vertical side profile of the ridges 5 when so resurfaced which Maybon achieves by applying the resurfacing material in a plurality of layers and with little melting of the underlying base material of the ridges and certainly without forming a puddle of melted die body material

which would clearly compromise the shape of underlying ridges. Moreover, having avoided compromise of the underlying ridge and developed the desired ridge side shape by multiple layer application of surfacing material, Maybon does not teach or suggest the machining of lateral sides of the deposit, as claimed.

Therefore, it is respectfully submitted that Maybon may not be relied upon to mitigate the deficiencies of Baker et al. in regard to answering the explicit recitations of new claims 38 and 44, cannot properly be combined therewith, does not supplement Baker et al. in regard to claimed features not contained therein and does not contain teachings or suggestions or other evidence or the level of ordinary skill in the art which would support a conclusion of obviousness of the subject matter of any claim in the application, taken as a whole. These deficiencies of the (improper) combination of Baker et al. and Maybon are not mitigated by the teachings of Boucher et al. or Cox et al.

It appears that the Examiner may recognize the possible improper combination of Baker et al. and Maybon and appears to apply Boucher et al. in order to reconcile the improper combination. While Boucher et al. teaches some metallurgical benefits to be derived from use of pre-alloyed powder, the blade developed is a shear blade rather than a die blade as in Baker et al. or a comminuting blade as in Maybon. More importantly, however, Boucher et al. discusses only welding, albeit including mention of a laser torch (column 3, lines 50 - 60) among other heat sources, and appears to be silent in regard to the method of application of the pre-alloyed powder material, much less teaching or suggesting forming a puddle of die body material and application of powdered blade material thereto. Further, while the Examiner asserts that it would be obvious to apply the materials of

Boucher et al. using the technique of Maybon, there is no clear indication in Maybon or Boucher et al. that the freedom from metallurgical defects would accrue under the conditions of brazing discussed in Maybon and, in any event, neither Boucher et al. nor Maybon teaches or suggests the puddling of die body material and application of the blade material powder thereto but, on the contrary, Boucher et al., by referring to welding processes appears to indicate reliance thereon (possibly including the more complete alloying or intermixing characteristic of a weld) to obtain the intended results.

Therefore, it is respectfully submitted that the combination of Baker et al. Boucher et al. and Maybon do not teach or suggest the steps now explicitly recited in claims 38 and 44 or any dependent claim. Accordingly, it is respectfully submitted that the ground of rejection based on these references is clearly in error and untenable in regard to claims 38 and 44 and claims dependent thereon and reconsideration and withdrawal of the same is respectfully requested.

In regard to the rejection of claims 8, 9, 11, 25 and 26 (and 15) which recite features of pre-deposition and post-deposition thermal treatment and the additional reliance on Cox et al. for teaching this feature, it is respectfully submitted that while Cox et al. does, indeed, teach such a feature, the Examiner does not assert or even suggest that Cox et al. contains any teaching or suggestion which supplements the other references applied or mitigates their deficiencies in regard to the subject matter of the claims from which claims 8, 9, 11, 25 and 26 depend. It is a meritorious effect of the invention that thermal treatment is not required in accordance with the invention and the properties of the blade deposit closely approximate those of the blade material if not maintained exactly the same. Nevertheless, in some

cases additional beneficial effects may be obtained by applying further thermal treatment to the die formed by the maore basic invention. Therefore, notwithstanding the content of Cox et al. in regard to the feature recited in these claims, Cox et al. has no bearing on the patentability of any claim since dependent claims 8, 9, 11, 25 and 26 recite the heat treatment feature *in combination with* the features of other claims which are clearly not taught or suggested by the remaining prior art applied.

In summary, it is respectfully submitted that claims 38, 2 - 12, 25, 26, 30, 31 and 39 - 44 are clearly and patentably distinguished from the prior art relied on in the present official action and that no *prima facie* demonstration of anticipation or obviousness of any claim may be made based thereon. On the contrary, the Examiner's application of such prior art appears throughout to be an attempted hindsight reconstruction of the invention which is clearly insufficient to answer the explicit recitations of the claims as now presented and that the present claims are clearly and patentably distinguished therefrom. Accordingly, reconsideration and withdrawal of the present grounds of rejection are respectfully requested.

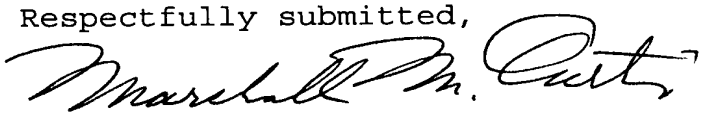
A sincere effort has been made to reduce and resolve issues remaining in this application including full accommodation of and consistency with the Decision on Appeal. Should the Examiner become aware of any point at which issues remain unresolved or any other issue precluding allowance of the application, it is respectfully requested that the Examiner contact the undersigned (through the Attorney of record, if necessary, since the undersigned is not currently of record and the present response, authorized by the assignee of the entire interest in this application, is being filed pursuant to 37 C.F.R. §1.34 although a

Power of Attorney to the undersigned will be filed shortly) in order that an interview may be conducted personally and/or by telephone, to expeditiously resolve the same.

Since all rejections, objections and requirements contained in the outstanding official action have been fully answered and shown to be in error and/or inapplicable to the present claims, it is respectfully submitted that reconsideration is now in order under the provisions of 37 C.F.R. §1.111(b) and such reconsideration is respectfully requested. Upon reconsideration, it is also respectfully submitted that this application is in condition for allowance and such action is therefore respectfully requested.

A petition for a three-month extension of time has been made above. If any further extension of time is available and required for this response to be considered as being timely filed, a conditional petition is hereby made for such extension of time. Please charge any deficiencies in fees and credit any overpayment of fees to Attorney's Deposit Account No. 50-2041.

Respectfully submitted,



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Attachment: Comparative photographs A - F